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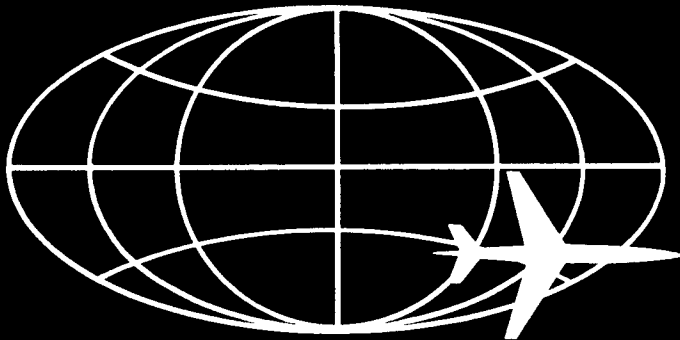
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# AIRCRAFT NUCLEAR PROPULSION DEPARTMENT



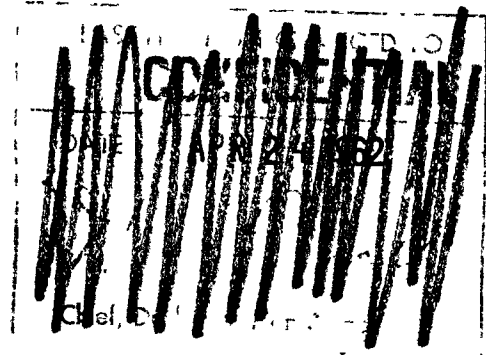
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FRONT SHIELD WEIGHT AND C. G.

E. Phelps  
STRESS AND WEIGHT ANALYSIS UNIT

February 16, 1961



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February 16, 1961

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This report contains a weight breakdown by structure and shielding for the components of the front shield as defined by the 12-30-60 drawing release of the drawings listed on Page 15.

The weight of the total front shield is shown on Page 4 indicating structure, shield and instrumentation weights. The annulus structure and shielding are shown on Pages 5 and 6. The island structure and shielding are shown on Pages 7, 8, and 9.

The reference axes for the horizontal center of gravity are shown in Figure 1, Page 10. It is assumed that the front shield is symmetrical with respect to the lateral and vertical axes. Pages 11 and 12 are center of gravity tables for the annulus and island respectively.

All weights have been calculated to nominal dimensions and do not include tolerances for density and manufacturing variations.

A material breakdown of the annulus and island is also included on Pages 13 and 14.

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DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

1st REVIEW DATE: 7-10-97	DETERMINATION (CIRCLE NUMBER(S))
AUTHORITY: OAC OADC WADD	1. CLASSIFICATION RETAINED
NAME: <i>James E. Keyes</i>	2. CLASSIFICATION CHANGED TO: _____
2ND REVIEW DATE: 7-18-97	3. CONTAINS NO DOE CLASSIFIED INFO.
AUTHORITY: ADG	4. COORDINATE WITH: _____
NAME: <i>John Davis</i>	5. CLASSIFICATION CANCELED
	6. CLASSIFIED INFO BRACKETED
	7. OTHER REVISIONS

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PREPARED BY	DATE	AIRCRAFT NUCLEAR PROPULSION DEPARTMENT <b>GENERAL  ELECTRIC</b> WEIGHT CALCULATION SHEET	DRAWING NUMBER	REV.
CHECKED BY			207R820	
		PAGE	OF	

PART NAME	PART NUMBER	VOLUME CALCULATION	WEIGHT FACTOR	UNIT WEIGHT	QUAN. ASSY.	EXTENDED WEIGHT	CODE
Total Front Shield		<i>Real Prob</i> 2-20-61 5692		((5695))			
Total Structure		1015		((1015.00))			
Annulus Structure				590.00			
Island Structure				425.00			
Total Shielding				((4630))			
Total Be		4085		(4085)			
Annulus				715			
Island				3370			
Total B. St.St.		542		(545)			
Annulus		120		120			
Island		422		425			
Instrumentation		Est. <sup>SD</sup>		((50))			

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WEIGHT	H. A.	V. A.	L. A.	Front Shield	DRAWING NUMBER	REV.
					207R820	









PREPARED BY	DATE	AIRCRAFT NUCLEAR PROPULSION DEPARTMENT <b>GENERAL ELECTRIC</b> WEIGHT CALCULATION SHEET	DRAWING NUMBER	REV.
CHECKED BY			207R820	
		PAGE	OF	REV.

PART NAME	PART NUMBER	VOLUME CALCULATION	WEIGHT FACTOR	UNIT WEIGHT	QUAN. ASSY.	EXTENDED WEIGHT	CODE
						(3369.415)	
Island Shield	761D112 - 1		.067	11.347	4	45.388	
	- 2		.067	14.074	3	42.222	
	-33		.067	14.609	1	14.609	
Island Drag Link	761D108 -P2			.216	4	.864	
	-P4			.247	4	.988	
	-P8			.414	4	1.656	
	-P9			.216	4	.864	
Island Shield Disk	656E781 -Sh1			111.822	1	111.822	
	-Sh2			444.281	1	444.281	
	-Sh3			638.577	1	638.577	
	-Sh4			516.118	1	516.118	
	-Sh5			399.657	1	399.657	
	-Sh6			371.324	1	371.324	
	-Sh7			382.386	1	382.386	
	-Sh8			197.045	1	197.045	
	-Sh11			64.747	1	64.747	
	-Sh12			31.317	1	31.317	
Control Rod Shielding	977C238 -P1		.067	2.199	48	105.55	

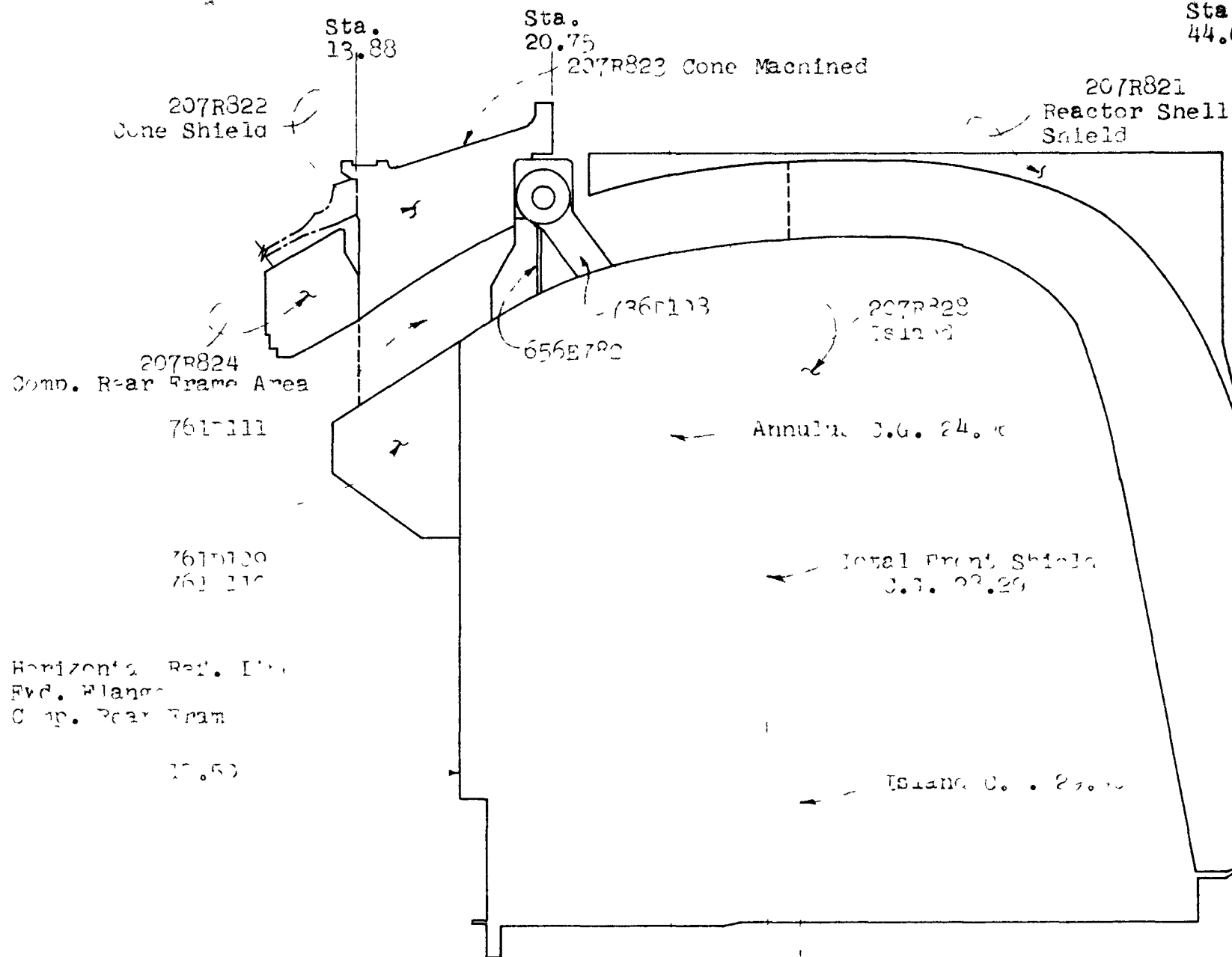
CODE	WEIGHT	H. A.	V. A.	L. A.	DRAWING NUMBER	REV.
					Island Shielding - Be + 1W/OB,,	207R820

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FIGURE 1

FRONT SHEET



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8 Shaft

FRONT SHIELD ANNULUS WEIGHT AND CENTER OF GRAVITY

ITEM	DWG. NO.	WEIGHT	C. G.	
Component Rear Frame Structure	207R824	25.0	12.30	
Cone Shield Attachment	207R822	35.0	17.70	
Cone Machined	207R823	350.0	17.20	
Support Brackets	207R822	35.0	18.21	
Annulus (Core)	207R821	130.0	37.10	
Pressure Vessel Attachments	207R826	15.0	28.9	
Total Structure		590.0	21.76	12840.85
Be Component Rear Frame	207R824	130.0	12.30	
Be - Cone	207R822	230.0	17.70	
Pressure Vessel	207R826	65.0	28.9	
Annulus Forward	207R821	40.0	24.45	
Annulus Aft	207R821	250.0	41.63	
B. St. St.	207R821	120.0	31.65	
Total Shielding		835.0	27.22	22732.00
Total Annulus		1425	24.96	35572.85

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FRONT SHIELD ISLAND WEIGHT AND CENTER OF GRAVITY

Island Structure Supports	207R828	55.0	23.96	
Cylinder	207R829	85.0	33.84	
Drag Links	736D108	35.0	29.38	
Cowling	761D109	35.0	14.16	
Cowling Ring	761D110	15.0	16.80	
Support Beam	656E782	110.0	20.51	
Control Rod Drive Support	656E783	20.0	16.85	
Fairing	761D111	25.0	20.50	
Seal	736D983	10.0	16.38	
Seal	736D992	10.0	43.20	
	656E785	25.00	27.35	
 Total Structure		 425.0	 24.37	 10355.75
 Shielding Be	761D112-1	45.388	19.4	
	-2	42.222	21.6	
	-3	14.609	21.6	
	761D108	4.372	29.38	
	656E781-Sh1	111.822	17.99	
	-Sh2	444.281	20.50	
	-Sh3	638.577	24.58	
	-Sh4	516.118	28.21	
	-Sh5	399.657	31.07	
	-Sh6	371.324	33.61	
	-Sh7	382.386	36.18	
	-Sh8	197.045	38.27	
	-Sh9	264.599	39.35	
	-Sh10	157.724	40.01	
	-Sh11	64.747	40.78	
	-Sh12	31.317	42.12	
	977C238-P1	105.55	29.00	
 Total Shielding		 3791.738	 29.97	 113,627.968
 Total Island		 4216.738	 29.40	 123,983.7187

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ANNULUS MATERIAL BREAKDOWN

	Inconel "X"	304 St. St. ‡ 1 W%B	Be ‡ 1 W%B
207R824	25.0		130.0
207R822	70.0		230.0
207R823	350.0		
207R821	130.0	120.0	290.0
207R826	15.0		65.0
TOTAL	590.0	120.0	715.0

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ISLAND MATERIAL BREAKDOWN

	Inconel	Inconel "X"	Be+1W/B	B7A26	304 B.St.St.
207R828	38	16		1	
207R829	2	83			
736D108		30			
761D109	35				
761D110	15				
656E782		110			
656E783	20				
761D111		30			
736D983		10			
736D992		10			
656E785		25			
656E781			3158		425
761D112			102		
761D108			4		
977C238			106		
Instrumentation		50			
TOTALS	110	364	3370	1	425

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LIST OF DRAWINGS

DRAWING	SHEETS	TITLE
207R820	1	Ref. Front Shield Layout - Final
207R821	2	Final - Shield Reactor Shell
207R822	1	- Shield Cone
207R823	1	- Cone Machined
207R824	1	- Compressor Rear Frame Area
207R826	2	- Shield Pressure Vessel
207R827	1	- Shield Reactor Shell Instrumentation
207R828	2	- Island Assembly
207R829	1	- Island Cylinder
207R830	1	- Island Instrumentation
207R831	1	- Triple Flange
656E781	12	- Island Shield Discs
656E782	1	- Island Support Beam
656E783	1	- Island Control Rod Drive Support
656E785	13	- Island Discs Instrumented
761D108	2	- Island Drag Link
761D109	1	- Island Cowling
761D110	1	- Island Cowling Ring
761D111	1	- Island Fairing
761D112	3	- Island Shield Blocks
736D992	1	- Core Seal #1
736D983	1	- Compressor Frame Seal #10

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